

COMPACT SCIENCE 4

(Book Solution)

1. Food Making in Plants

Checkpoint 1

1. Glucose 2. chlorophyll 3. take 4. Starch

Checkpoint 2

1. True 2. False 3. False 4. False

Exercises

- A. 1. (b) 2. (d) 3. (a) 4. (c)

- B. 1. leaves 2. chlorophyll 3. food 4. water; minerals

- C. 1. Stomata help in the exchange of gases and water vapour between the leaf and the air.

2. Chlorophyll makes the leaves look green and helps in the synthesis of food.

3. Xylem carries water taken by roots to all parts of the plant.

4. Phloem carries food made by leaves to all parts of the plant.

- D. 1. Carbon dioxide + Water $\xrightarrow[\text{Chlorophyll}]{\text{Sunlight}}$ Glucose + Oxygen
+ Water vapour

2. The food manufactured by plants is used for growth, building new cells, and to repair worn-out cells.

3. Pitcher plant:

(a) It digests insects to get required minerals.

(b) Its leaves take the shape of pitchers.

Cactus:

(a) Its stem becomes green, thick and fleshy.

(b) Its leaves get changed into spines.

4. Cacti save water because they grow in deserts and do not get enough water from soil.

5. (a) Animals breathe out carbon dioxide which is used by plants for making food while in turn, plants release oxygen which is used by animals for breathing.

- (b) Animals get food from plants and when die, they become part of the soil and make it rich in minerals which are used by plants.

6. Hint: Refer to diagram, 'Structure of Leaf'.

HOTS

1. Root hair; Root hair is a part of root, rest are parts of a leaf.
2. Stomata; Stomata help in exchange of gases, rest distribute water and food in the plant.
3. Carbon dioxide; Carbon dioxide is used, whereas rest are produced by plants during photosynthesis.

2. Adaptations in Plants

Checkpoint 1

1. Habitat 2. Terrestrial plants 3. Cones
4. Mangroves 5. Spiny leaves

Checkpoint 2

1. Lotus 2. Waterlily 3. Water hyacinth 4. Yam

Exercises

- A.** 1. (a) 2. (a) 3. (a)
- B.** 1. Aquatic plant 2. Terrestrial plant
3. Terrestrial plant 4. Aquatic plant
5. Aquatic plant 6. Terrestrial plant
- C.** 1. False 2. False 3. True 4. True 5. False
- D.** 1. Hilly plants have shorter stems, needle-like leaves and conical shape.
2. Plants growing in plains are mostly big trees, have big and broad leaves. They shed leaves in winters and grow new ones in spring.
3. (a) Desert plants have long root system that goes deep in the ground to get water.
(b) Their stems become fleshy by storing water.

- (c) They have waxy coating on leaves and stems to reduce water loss.
- (d) In some plants, leaves change into spines.
- 4. As mangroves grow in waterlogged soil, their roots grow out of the soil to get air.
- 5. The submerged plants carry out exchange of gases through their body surface.

HOTS

- 1. Pineapple fruit has spines to protect itself from animals.
- 2. Some plants produce a poisonous sap to save themselves from animals.
- 3. Aquatic plants have a waxy coating on their outer surface to save themselves from rotting in water.

3. Adaptations in Animals

Checkpoint 1

- 1. Tree 2. Snow 3. Water 4. Caves, old buildings
- 5. Desert 6. Tree
- 7. Snow 8. Land, water

Checkpoint 2

- 1. Herbivore 2. Carnivore 3. Parasite
- 4. Camouflaging animal

Exercises

- A. 1. (a) 2. (c) 3. (c)
- B. 1. False 2. False 3. True 4. False
- C. 1. snake 2. fur 3. tail 4. webbed
- D. 1. Duck 2. Squirrel 3. Camel 4. Snake
- E. 1. Amphibians breathe through lungs on land and through skin in water.
- 2. The hiding of some animals in warm places to save themselves from cold during winters is called hibernation. Frog and Lizard are hibernating animals.

3. The merging of an animal by means of its body colour with its surroundings for protecting itself from its enemies is called camouflaging. For example, chameleon changes its colour according to its surroundings. The body colour of grasshopper is exactly the colour of the leaves of plants.
4. Porcupine has spines on its body to protect itself from its enemies.

HOTS

1. Tigers have strong legs to run very fast for catching their prey.
2. Parasitic animals do not have teeth because they suck the food from the body of their host.
3. A grasshopper is exactly the colour of green grass to make it difficult to be spotted by its enemies.

4. Reproduction in Animals

Checkpoint

1. True 2. True 3. False 4. False 5. False

Exercises

- A. 1. (a) 2. (b) 3. (a) 4. (c)

- B. 1. embryo 2. tadpole 3. moulting 4. pupa 5. cocoon

- C. 1. Reproduction 2. Reptiles 3. Yolk 4. Spawn

- D. 1. **The process by which animals produce babies of own kind is called reproduction.**

2. Birds, Fishes, Reptiles, Amphibians and Insects.

3. **Hint:** Refer to figure, 'Structure of a bird's egg'.

4. Four stages – Egg, larva, pupa and adult.

5. The frog produces spawn of eggs in water. The eggs hatch into tadpoles which develop legs and arms and grow into young frogs with tails. After a few days, their tail disappears and adult frogs are formed.

6. By feeding and protecting them from enemies.

HOTS

- (a) Frog; Frog is an amphibian, rest are insects.
(b) Crow; Crow is a bird, rest are reptiles.
(c) Tadpole; Tadpole is a larva, rest are adults.
(d) Dolphin; Dolphin is a mammal, rest are birds.
- (a) Mammals take good care of their babies. They feed them and keep them safe until they learn to look after themselves.
(b) A tadpole looks like a fish because it lives in water, and has a long tail and gills.

5. The World of Microbes

Checkpoint 1

1. True 2. False 3. True

Checkpoint 2

- Cholera, Tetanus
- Common cold, Polio
- Dysentery, Malaria

Exercises

- A.** 1. (d) 2. (a) 3. (c) 4. (c)
- B.** 1. Viruses 2. Protozoa 3. Fungi 4. hot; damp
- C.** 1. Microbes are tiny organisms that can be seen only under a microscope. They are bacteria, viruses, protozoa and fungi.
- Bacteria are round, rod-shaped, spiral and comma-shaped.
 - Fungi are not able to make their own food because they do not have chlorophyll.
 - Removal of water from a substance is called dehydration.
 - Boiling kills harmful microbes present in the milk.
 - Too much of salt in pickles and sugar in jams does not allow microbes to grow.

HOTS

1. Cholera; Cholera is a bacterial disease, rest are viral diseases.
2. Chickenpox; Chickenpox is caused by virus, rest are bacterial diseases.
3. Washing; Washing is an act of cleaning something, rest are methods of preserving food.
4. Protozoa; Protozoa are classified as animals, rest are classified as plants.

6. Healthy Eating

Checkpoint 1

1. False 2. False 3. False 4. True

Checkpoint 2

1. Balanced diet 2. Overcooking 3. Steaming 4. Jams

Exercises

- A. 1. (b) 2. (c) 3. (d) 4. (b)

- B. 1. nutrients 2. carbohydrates; fats 3. protein
4. roughage 5. preservation

- C. 1. We need food to stay alive and to get energy, grow and keep the body fit.
2. The diet that contains the right amount of all the nutrients is called a balanced diet.

The main components of a balanced diet are the food items from grain group, fruit group, vegetable group, meat group and milk group.

3. Vitamins and minerals are important because they protect us from diseases.
4. Boiling, frying, steaming, roasting and baking are different ways of making food edible.
5. Overcooking of food should be avoided because it destroys the nutrients of the food.

6. The process of protecting food from getting spoiled by microbes and keeping it safe for longer period of time is called food preservation. Baking, salting, drying, refrigeration, etc. are different ways of food preservation.

HOTS

1. (a) Cashewnut; Cashewnut is a dried-fruit, rest are vegetables.
(b) Apple; Apple is a fruit, rest are fats.
(c) Potato; Potato contains carbohydrate, rest contain protein.
2. (a) Lemons and citrus fruits are rich source of vitamin C which protects us from many diseases.
(b) Raw food is not always preferred because some food items in raw form are not easily digested.
(c) Athletes need more carbohydrates and proteins because they have to perform lots of physical activities which require extra energy and strong muscles.

7. Teeth and Digestion

Checkpoint 1

1. Milk teeth 2. Pulp 3. Canines 4. Enamel 5. Root

Checkpoint 2

1. bad breath 2. starch 3. small intestine
4. large intestine

Exercises

- A. 1. (a) 2. (b) 3. (c) 4. (b)
B. 1. False 2. True 3. True 4. True
C. 1. (b) 2. (a) 3. (e) 4. (c) 5. (d)
D. 1. The teeth that grow between the age of six and nine months and fall out between six and twelve years of age are called milk teeth. They are 20 in number. The new set of teeth that takes place of milk teeth is called permanent teeth. They are 32 in number.

2. (a) Incisors – They are used to bite the food.
(b) Canines – They are used for tearing the food.
(c) Premolars – They are used for crushing the food.
(d) Molars – They are used for grinding the food.
3. (a) Brushing teeth twice a day.
(b) Rinsing mouth after every meal.
(c) Avoiding too much of sweets and aerated drinks.
(d) Getting checked by dentist regularly.
4. Mouth → Food pipe → Stomach → Small intestine → Large intestine → Anus
5. **Hint:** Refer to figure, 'Structure of a tooth'.

HOTS

1. Unhealthy teeth cannot chew the food well. The unchewed food cannot be digested properly.
2. Chewing the food well while eating mixes saliva properly with it and helps in the digestion.
3. Teeth at the back of jaw are broader to crush and grind the food properly.

8. Staying Safe

Checkpoint

1. No 2. No 3. No 4. Yes

Exercises

- A. 1. (b) 2. (b) 3. (a) 4. (b)

- B. 1. zebra 2. labelled 3. sand 4. open

- C. 1. False 2. True 3. False 4. False 5. True

- D. 1. An accident is an unfortunate, unexpected and unintentional incident that harms us.
2. We should wear life jacket while swimming to avoid drowning.
3. (a) Walk on footpath.

- (b) Cross the road at Zebra crossing.
 - (c) Before crossing the road, look at left and right sides one by one and cross when it is clear.
 - (d) Avoid walking between the vehicles.
 - (e) Never play on or near the road.
 - (f) Do not talk on phone while crossing the road.
4. The first help given to an injured person before the doctor comes is called first aid.
 5. We should keep medicines in labelled bottles inside locked cupboards to keep them out of reach of children.
 6. By making the person sit and lean the head forwards and closing the nose by holding it between the thumb and fingers.

HOTS

1. Applying a cold pack on a bruise slows down the bleeding under the skin.
2. So that he does not swallow blood.
3. A cut or wound should not be left open to prevent dust or germs from entering the cut or wound.

9. Clothes for Us

Checkpoint 1

1. Early human 2. Heat of sun 3. Jute plant
4. Cotton clothes

Checkpoint 2

1. FABRICS 2. SILK 3. DRYCLEAN 4. MOTHBALLS

Exercises

- A.** 1. (a) 2. (d) 3. (d) 4. (a)
- B.** 1. False 2. True 3. False 4. False
- C.** 1. The early humans wore leaves, animal skin and the bark of trees.
2. We need clothes to cover our body.

3. Clothes are made from natural fibres such as cotton, linen, wool, silk and fur, and from man-made fibres such as nylon, rayon and polyester.
4. Socks and shoes protect our feet from dust, heat, cold, insects, worms and germs. They also protect us from getting hurt.
5. The clothes of a patient should always be cleaned with some antiseptic solution.
6. The woollen and silk clothes should be cleaned, kept in the sun and stored with mothballs or dried neem leaves.
7. Cotton clothes are preferred during summers as they are porous and soak the sweat easily and keep the body cool.

HOTS

1. Synthetic clothes are nonporous and do not soak water. Therefore, they dry very quickly.
2. White or light-coloured clothes do not absorb much heat from the sun and keep our body cool.
3. Synthetic fibres are waterproof. They do not allow water to get into the objects made of them.

10. Water

Checkpoint 1

1. Snowflakes or Snow
2. Hailstones
3. Dew
4. Rain

Checkpoint 2

1. Water table
2. Water cycle
3. Clouds
4. Water pollution
5. Boiling / Potassium permanganate / Chlorine

Exercises

A. 1. (d) 2. (b) 3. (a) 4. (d) 5. (a) 6. (c)

B. 1. humidity 2. condenses 3. water table
4. jaundice; cholera

C. 1. (e) 2. (d) 3. (b) 4. (a) 5. (c)

- D. 1. Clouds are formed by gathering of water droplets present in the atmosphere.
2. Temperature, surface area, speed of wind and humidity.
3. **Rain:** When small droplets of clouds collide with each other, they form bigger and heavy drops. These drops fall as rain.
Snow: In colder regions, when temperature is very low, water vapour in the clouds freezes into ice crystals which fall as snow.
Hail: When raindrops pass through very cold regions of the earth's atmosphere, they freeze into small round balls of ice and fall as hail.
4. The mixing of harmful substances in water is called water pollution.
The polluted water can be purified and made fit for drinking by sedimentation and decantation, filtration, boiling and chlorination.
5. **Hint:** Refer to figure 'Water cycle in nature'.

HOTS

1. During winter, mornings are generally foggy and have reduced visibility which hinders the landing and take off of flights.
2. During rainy season, rainwater seeps into porous layers of the earth and gets collected there and raises the water table.
3. During rainy season, the amount of water vapour in air is very high, therefore, the rate of evaporation is low. So the clothes do not dry easily in this season.

11. Weather

Checkpoint

1. Weather 2. Climate 3. Temperature 4. Sea breeze

Exercises

- A. 1. (b) 2. (c) 3. (a)

- B.** 1. weather 2. slanting 3. faster; water 4. lighter
- C.** 1. Noons are hotter than mornings and evenings because sunrays fall straight on the earth at this time and stay in a small area making it hot.
2. Weather is the state of atmosphere at a particular place and time, whereas climate is the average weather condition at a particular place over a long period of time.
3. Rural areas are cooler than towns and cities because they are generally open, green and have lesser number of dwelling places.
4. Weather forecasting helps us know whether the day will be cold or hot or cloudy or rainy. It helps farmers and fishermen to plan their work.
5. The difference in heating and cooling of land and water, and expansion of air on heating cause sea and land breezes.

HOTS

1. The hot air is lighter which raises balloon up in the air.
2. Nights are cooler in deserts because sand gets heated up quickly during the day and loses more heat at night and becomes cool.
3. Room heaters make the room air warm which becomes lighter and rises up, whereas air-conditioners cool the air which is heavier and tends to remain at lower level.

12. Matter and Materials

Checkpoint 1

1. Yes 2. No 3. Yes 4. Yes

Checkpoint 2

1. Salt in water; Sugar in water
2. Milk in water; Lemon juice in water
3. Carbon dioxide in water; Oxygen in water

Exercises

- A.** 1. (d) 2. (a) 3. (b) 4. (b)

- B.** 1. False 2. False 3. True 4. False
- C.** 1. space; weight
2. atoms
3. molecule
4. solid, liquid; gas
- D.** 1. Anything that takes up space and has weight is called matter.
2. Molecules are particles formed by the combination of atoms of same or different kinds.
3. The molecules of water are made up of two different types of atoms, i.e., hydrogen and oxygen, whereas molecules of chlorine are made up of same type of atoms, i.e., chlorine.
4. When an agarbatti is lighted, its molecules get far apart from each other and easily spread through all the space in the room.
5. The process of changing a liquid into its vapour form is called evaporation. The phenomenon opposite to evaporation is called condensation.
6. When a substance mixes in another substance completely, it forms a solution.
7. **Hint:** Refer to figures under the heads 'Solid', 'Liquid' and 'Gas' respectively.

HOTS

- (a) Water; Water is liquid, rest are solids.
(b) Ice; Ice is a solid, rest are gases.
(c) Milk; Milk mixes in water, rest make a film on the surface of water.
(d) Milk; Milk is liquid, rest are solids.
- The balloon gets inflated because the gas formed by the shaking of the bottle of club soda takes the space inside the balloon.
- On dissolving sugar in water, the molecules of sugar take the space between the molecules of water. Hence, the volume of water does not rise.

13. Force, Work and Energy

Checkpoint 1

1. Muscular force
2. Gravity
3. Solar energy
4. Hydroenergy

Checkpoint 2

1. False
2. False
3. True
4. True

Exercises

- A.** 1. (d) 2. (b) 3. (d)
- B.** 1. True 2. True 3. False 4. False
- C.** 1. Muscular force 2. Gravity 3. Friction
4. Muscular force 5. Gravity
- D.** 1. Force is a pull or push that makes some changes in an object.
2. A force can make an object move, stop a moving object, change the direction of a moving object and change the shape of an object.
3. We need energy to do different types of work. Four different forms of energy are solar energy, wind energy, hydroenergy and muscular energy.
4. The sources of energy that cannot be finished are called renewable sources of energy. They are the sun, wind and water.
5. Fuels such as coal, petrol, diesel and Compressed Natural Gas (CNG) are called fossil fuels.
They were formed from the remains of dead plants and animals which got buried under the earth millions of years ago.
6. Machines make our work easier and faster by changing the direction of the applied force.
7. Some simple machines are pulley, pliers, screw, screwdriver, bottle opener, scissors, nutcracker, etc.

HOTS

1. Change of climate; Change of climate is a natural process, rest are carried out by applying some force.
2. Friction; Friction is a kind of force, rest are different forms of energy.
3. Metre rod; Metre rod is a device for measuring length; rest are simple machines.

14. Our Solar System

Checkpoint 1

1. Star 2. Orbit 3. Planet 4. Dwarf

Checkpoint 2

1. axis 2. hemisphere
3. outer 4. tilted axis; revolution

Exercises

- A. 1. (a) 2. (a) 3. (c) 4. (d) 5. (a)
- B. 1. False 2. True 3. False 4. False
- C. 1. galaxy 2. star 3. Saturn 4. equator 5. crust
- D. 1. Star 2. Orbit 3. Planet 4. Earth 5. Pluto
- E. 1. A star is a huge ball of hot gases which gives out heat and light.
2. Galaxy is a huge group of stars.
3. Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.
4. The Earth is a unique planet because it is the only planet in the solar system which has air and water and hence life on it.
5. Stars are the heavenly bodies that give out heat and light, whereas planets are the heavenly bodies that revolve around the stars and do not have their own heat and light but reflect the light of their closest star falling on them.

6. (a) The outer layer is called crust.
(b) The middle layer below crust is mantle.
(c) The innermost layer is called core.
7. The tilted axis of the Earth and the movement of earth around the Sun, i.e., revolution cause change in seasons on the Earth.
The four main seasons are spring, summer, autumn and winter.

HOTS

1. When the north pole is tilted towards the sun, it gets more sunlight and has summer. On the other hand, south pole gets less sunlight and has winter. The condition becomes just opposite when the south pole tilts towards the sun and the north pole is away from the sun. Therefore, northern and southern hemispheres always have opposite seasons.
2. Stars are not seen during the daytime because of the bright glare of the sun.
3. Seasons are caused due to revolution of the Earth around the sun. It takes the Earth one year to complete its one revolution. Therefore, each season takes a year to come again.